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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.     | CONFIRMATION NO.       |
|---|-------------|----------------------|-------------------------|------------------------|
| 10/597,136  | 07/12/2006  | Kcnji Kitamura       | SHM-16693               | 6533                   |
| 40854   | 7590        | 12/14/2007           |                         |                        |
| RANKIN, HILL, PORTER & CLARK LLP<br>38210 Glenn Avenue<br>WILLOUGHBY, OH 44094-7808 |             |                      | EXAMINER<br>LI, MEIYA   |                        |
|   |             |                      | ART UNIT<br>2811        | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>12/14/2007 | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

T/H

**Office Action Summary**

Application No.

10/597,136

Applicant(s)

KITAMURA ET AL.

Examiner

Meiya Li

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

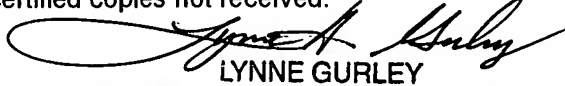
**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 12 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
 LYNNE GURLEY  
 SUPERVISORY PATENT EXAMINER  
 AU 2811, TC 2800

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/12/06</u>   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on July 18, 2007 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Objections***

3. Claims 1-2 are objected to because of the following informalities:
4. In claim 1, the phrases "the upper part ..." in line 12, "the upper part of the cell region" in line 13, and "the underside ..." are improper. Changing to the phrases "an upper ..", "an upper part of the cell region", and "an underside ..." are suggested. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 1-2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. The claimed limitation of "a cell region including the emitter region has been made deep", as recited in claim 1, lines 10-11, is unclear as to which element is made deep. Also unclear as to the structural relationship between the guard ring and diffusion.
8. The claimed limitation of "the underside of a buffer layer of the first conductive type" in claim 1, line 14-15, is unclear as to the structural relationship between the buffer layer and the device module structure.
9. The claimed limitation of "the module structure of a semiconductor device" in claim 2, line 2, is unclear which semiconductor material is being referenced in claim 1 - the semiconductor device module in line 1 or an additional unclaimed semiconductor device module.
10. The claimed limitation of "a cathode electrode at an upper part of the diode part" in claim 2, line 3, is unclear as to the structural relationship between the cathode electrode and the upper part of the diode part.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

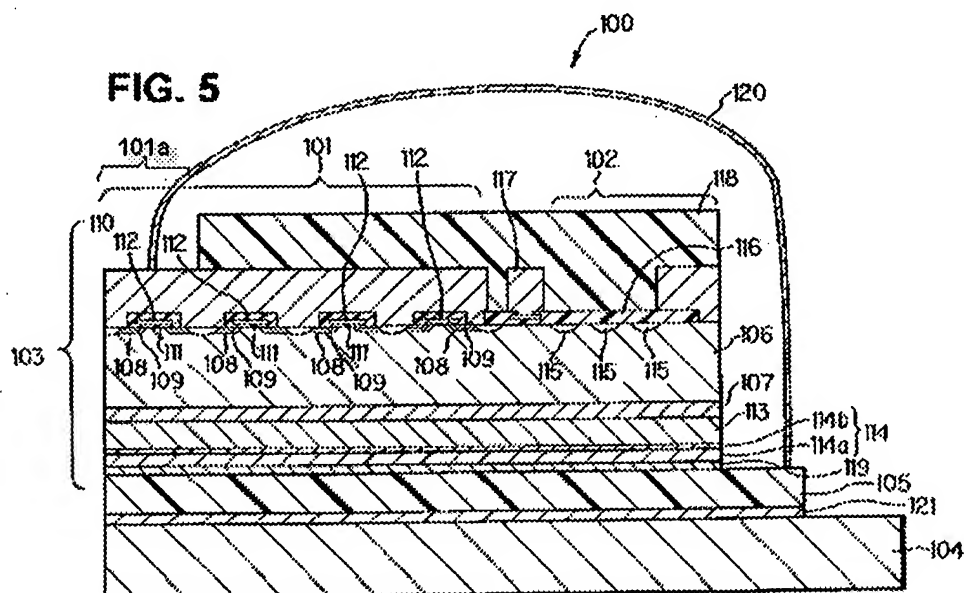
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

As for claim 1, Mamitsu et al. shows a semiconductor device 418 is bonded to a heat spreader 446 (Fig. 4).

However, Chiu et al. does not explicitly discuss the structure of the semiconductor device.



In the same field of endeavor, AAPA teaches a semiconductor device module structure 103/203 (Figs. 5-6) comprising: a high-resistance layer 106 of a first conductive type N; a base layer 108 of a second conductive type P formed in an upper

part of the high-resistance layer 106 of the first conductive type N; an emitter region 109 of a first conductive type N formed in an upper part of the base layer 108 of the second conductive type P; an emitter electrode 111 connected to the emitter region 109; an insulated gate electrode 111/112 adjacent to the base layer 108 of the second conductive type P; a guard ring part 102 where diffusion around a cell region 101a including the emitter region 108 has been made deep; a passivation layer 118 formed on the upper part of the guard ring part 102 and not extending onto the upper part of the cell region 101a; a collector layer 113 of the second conductive type P<sup>+</sup> formed on the underside of a buffer layer 23 of the first conductive type N<sup>+</sup>; a collector electrode 29 connected to the collector layer 28.

As for claim 2, a diode part 203 (Fig. 6), and a cathode electrode 209 at an upper part of the diode part.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to include the semiconductor device module structure, as taught by AAPA, in the device of Chiu et al., with the motivation to achieve desired results of product.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ref's B-D are cited as being related to semiconductor device module structure.

Application/Control Number:  
10/597,136  
Art Unit: 2811


Page 6

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meiya Li whose telephone number is (571) 270-1572. The examiner can normally be reached on Monday-Friday 7:30AM-5:00PM Eastern Standard Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ML  
11/30/2007

  
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